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About a month afterwards Mr. Prender showed Mr. Smith two other bronze axes, subsequently discovered in quarrying at the foot of the same cliff, but lower down, not much above what may have been high-water mark.

Mr. Smith observed that the discovery of stone and bronze weapons together, and in connexion with two coins of the ninth century, appears to be a fact of no little importance in fixing a period in which these weapons were apparently in actual use.

Sir W. Betham communicated the following account of a meteor observed by him :

“ On Friday, the 2nd of November, about five minutes before five o'clock, P. M., I had just entered the gate of my house near Blackrock, when my attention was drawn to a luminous object approaching from the east towards me, at an elevation (as I supposed) of about 500 feet from the earth. Its apparent velocity was not greater than that of a rook in steady flight. It seemed to pass me at a distance of not more than 100 yards to the south, and, after keeping its elevation steadily, to disappear not more than 600 or 700 yards to the west of the place where I was standing.

“ It was a round, very brilliant ball, apparently about nine or ten inches in diameter, emitting flame and sparks from all its sides, and leaving behind it a luminous train, in which sparks continued visible at some distance from the ball for a few seconds.

“ I watched its progress carefully, but could not observe any tendency to descend towards the earth while it continued inflamed.

“ It disappeared suddenly, but, although I looked very anxiously, I saw no solid residuum fall.

“ It was seen by a servant of mine passing over the hill going up to Kingstown, on her way from the sea; and she tells me it passed almost directly over her head. She says she

thought it had been a rocket, but that it flew straight on, instead of going upwards.

“ It was daylight, and by no means a dark evening. I heard no hissing or any other noise, nor was there any report or explosion audible when the meteor disappeared.

“ The wind at the time was nearly due west, just opposite to the course of the meteor’s progress.”

Sir William Betham exhibited a rough sketch of the meteor.

George Alexander Hamilton, Esq., M. P., communicated the following note respecting the appearance of the meteor :

About ten minutes before 5 o’clock, P. M., on Friday, the 2nd, as Mrs. Hamilton was walking near Balbriggan, she observed a very brilliant meteor to the south, or S. S. E., at an angle of about 75° from the horizon. Its brightness was almost dazzling. The colour was nearly that of gas-light. It was then round, the size of an immense star, the outline very clearly defined. Instantaneously it increased in size, and changed into the form of a common paper kite. It then moved slowly, describing an arch, towards the west. As it began to descend, the pointed part threw off small balls, decreasing in size. These balls, constituting a kind of tail, separated from the globe almost immediately, and became extinguished. The globe continued the same size as it advanced along the arch, until it suddenly disappeared at some distance above the horizon.

Some country people at Ballygarth, between this place and Drogheda, state that they saw an extraordinary ball of fire, which appeared to fall to the ground.

Robert Mallet, Esq., read the following paper on the appearance of the meteor, and the method adopted by him to estimate its altitude and velocity :

“ On Friday evening last, the 2nd of November, 1849, while

returning to town, and waiting at Salt Hill station for the train, I observed, along with my eldest son, who accompanied me, a meteor of unusual size and brilliancy; and accidental circumstances having enabled me to make some tolerably accurate observations upon it, and to obtain those of other simultaneous observers, I deem the whole as possibly worthy of permanent record.

“ I was standing at Salt Hill station, with my face towards the east, and looking upwards, when, at about 30° of elevation, a bright light bearing a short tail suddenly appeared, and in motion. Its apparent motion was upwards, and it passed almost directly over my zenith, or perhaps about 10° to the south of it, and, continuing to move in a vertical plane almost precisely parallel to the line of rails at Salt Hill station, disappeared again at about 30° or 35° of elevation on the opposite or western side of our zenith. At the moment of its disappearance, I ran into the station house, and found the railway clock there shewed $54\frac{3}{4}$ minutes past 4 o'clock. I set my own watch accurately by this clock, and on coming into town ascertained, by comparison with the chronometer of Mr. Law of Sackville-street, that it was four minutes fast. Hence the true time of the extinction of the meteor was $50\frac{3}{4}$ minutes past 4 o'clock, mean time, within an error of twenty seconds at the most.

“ The day had been fine. It was clear daylight at the time, so that the faces of persons standing on the platform (many of whom saw the meteor) could be discerned clearly at fifty yards' distance. The sky was serene overhead, with a very few stars of the first magnitude just becoming visible, and some light, scirrus clouds tinged reddish by the sunset. The horizon all round presented a soft, neutral, grey haze, most dense over Dublin, and becoming evanescent at about 30° of elevation.

“ The meteor seemed to start into existence and to disappear just above the confines of the haze (but was not eclipsed

by it), with the tail already formed and at first pointing towards the earth, or in reere of its apparent motion. It was moving at the first instant it was visible; passed across overhead apparently in an enormous arch, the highest point of which did not seem to the eye to be above a few hundred feet, and disappeared by sudden extinction in the south-west, the tail being then vertically above, as on its appearance it was vertically below the nucleus of light.

“ Its apparent velocity of motion was rather faster than that of a common rocket, and the whole time of visible trajectory was probably about four or five seconds. At the first moment it was taken to be a rocket by several persons present, but an instant's observation of its intense light and short tail shewed it to be no artificial fire.

“ I fancied I heard a faint rushing or hissing sound, and immediately after asked my son, did he hear any noise. He replied in the negative, and although the impression was strong on my own mind, I fancy that the noise was but imaginary, and the effect of constant association with the noise of a rocket which the meteor so forcibly resembled.

“ The appearance of the meteor itself, of which I present a diagram, was of a body or nucleus of intense bluish white light; the forward portion keenly defined, and having a sort of conoidal or elipsoidal shape, something the form of Newton's solid of least resistance, while the rereward portion was irregularly radiating or brush-like, and throwing off laterally flashes of light, at angles up to 50° or 60° from its line of motion.

“ The apparent size of the head was something larger than the disk of Jupiter when nearest to us and seen best by the naked eye, but the light greatly more intense, as much so as that of a powerful galvanic battery, one of which I had just quitted using during the day, and the close similarity to the light from which at once struck both my son and myself.

“ The tail was about twenty apparent diameters of the body in length; it was of a reddish hue, and far less brilliant

than the body. It was at no time perfectly continuous, nor was it brush-like, but rather like a trail of sparks or flashes of yellowish red light left behind, and becoming rapidly extinct behind the body. Possibly the reddish tinge of the tail light was merely complementary to the bluish light of the nucleus. At about the highest apparent point of its course, the tail suddenly broke in two, as it were, and left a blank space between its remains which followed, and the body itself, for perhaps one-fifth of a second or thereabouts, during which interval the end of the divided tail next the body was larger and more luminous, as if a subordinate body or nucleus was temporarily being formed. The tail was of about the same length, and the body of the same magnitude and brilliancy, during the whole of its course.

“As it descended towards the west I watched it eagerly, to see if any solid body would drop from it, but there was no sign of any. It seemed to go out, as it appeared, with all the suddenness with which the arc of light appears and disappears, on making or breaking connexion of the poles of a large galvanic battery.

“There was no sound as of explosion at the moment of its extinction, nor any train of smoke or vapour left after it.

“The general shape of the meteor was that of a nail with the head flying foremost.

“On my return home at half-past 5 o'clock, I found that two other members of my family had each separately seen the flight of the meteor from different parts of our dwelling-house, at 98, Capel-street, Dublin. On examining them as to the time, I satisfied myself that they had both seen the same meteor, and the same that we saw at Salt Hill. I was also able to get each party to stand precisely in the spot he had witnessed the phenomenon from, and (the horizon being limited luckily in this case by buildings in all directions) to point out to me the precise points over those buildings, at which the meteor appeared and disappeared.

“ Then, by the aid of a theodolite, I obtained two separate measures for the greatest apparent altitude of the trajectory to each of these separate observers.

“ The angle of elevation above the horizon given by one was $46^{\circ} 5'$, and by the other, 43° ; and the course or plane of trajectory corresponded closely with that observed by us at Salt Hill, viz., from N. E. to S. W., 110° west of north. I find the distance in a straight line from my dwelling-house to Salt Hill station, as measured on the large scale map of the Ordnance Survey, is six miles and a quarter, as nearly as possible, or 33,000 feet. I have subsequently obtained from a third observer, close to the same locality, a third angle of apparent maximum elevation, which gives $53^{\circ} 5'$. Reducing these by a simple trigonometrical operation, and assuming all the observers to have been on the same horizon or level (which they were, within about fifteen feet), the actual culmination of the meteor, or greatest elevation above Salt Hill, would be from each of the observations as follows:

Elevation.

$43^{\circ} 0'$	. .	30,210 feet,	= 5.72 miles.
$46^{\circ} 5'$	. .	34,110 ,,	= 6.46 ,,
$53^{\circ} 5'$	. .	39,000 ,,	= 7.38 ,,

“ The latter observation was most likely (by circumstances) to be somewhat in error in angular excess. I am, therefore, on the whole, disposed to conclude that the actual elevation was about six miles. The meteor was, therefore, in air of little more than one-fourth the density of that at our surface, and at its greatest altitude might have been seen at a distance of above 200 miles.

“ It was seen from parts of the county of Carlow, and I should hope that several other observations may yet be obtained, by which its altitude (the most important of all elements at present to the study of these mysterious phenomena) may be still more correctly ascertained.

“ Assuming the flight of the meteor to have been in a

great circle, and at the average altitude above the earth's surface, as already found, of 35,000 feet, and the elevations having been observed by me, at Salt Hill, at the moments of appearance and of disappearance, we are enabled to obtain the length of the trajectory and the velocity of motion nearly; considering its flight to have been in a right line, which may be done without material error. The zenith distance of the body at the moment of apparition or of disappearance is

$$\frac{180^\circ - (30^\circ + 30^\circ)}{2} = 60^\circ = B,$$

and calling the altitude $a = 35,000$ feet,—we have, putting C for the entire trajectory,

$$\frac{C}{2} = a \frac{\sin B}{\cos B} = a \tan B,$$

from which we obtain $\frac{C}{2} = 60,621$ feet, and $C = 121,242$ feet, = 22.92 miles; which, taking the time of flight at four seconds, gives a velocity of 30,310 feet per second, or 5.74 miles, and at five seconds a velocity of 24,248.5 feet per second, or 4.59 miles. The least velocity being thus above twenty times that of sound in air, and almost that of some of the planets.

“The nucleus or body of the meteor, I have stated, appeared rather larger than the disk of Jupiter when largest. It then subtends a visual angle at the earth of $40''$, is distant 51,566 diameters of our earth, and its own diameter is 88,000 miles; hence we are enabled readily to calculate the actual diameter of the nucleus of the meteor, the height or distance of the eye from which we have found.

“The result of this operation gives a diameter for the nucleus of 95.4 inches, or nearly eight feet.

“Where there is no knowledge, conjecture is allowable, provided it be not that *mera palpatio* against which Bacon warns, but rather tending to some guiding hypothesis.

“In the present instance the senses were powerfully impressed with the vivid resemblance of this luminous mystery,

during every moment of its flight, to a *continuous discharge, at one moving point, of the most intense electric light*, and equally impressed with the absolute want of any solidity, or power of conveying to the senses any notion of weight or momentum, which the body suggested. May it not ultimately, then, be found, that these strange apparitions are but another form of electric discharge, in restoring the equilibrium of this great cosmical force in the higher regions of our atmosphere, of which we already know two other forms, at least in lightning and the aurora, and a third, that of the fire-ball, has been described by Arago (*Annuaire* for 1838)? Although hundreds of square miles of oppositely electrified cloud, or of strata of air, come at once within striking distance, yet the lightning flash starts out from one to the other but at a single point of space. Why may not then the electric discharge take place along a line of successive points? If so, many of the hitherto observed phenomena of meteors would be presented by this continuous or sustained blaze of lightning moving along the line in which was the locus of all the successive points of discharge.

“A good deal might be stated in rendering more probable this notion, by considering the prevailing direction of observed motion of meteors, and the periods of the year at which their occurrence has been most frequent; but I forbear for the present to enlarge upon it.

“I have only to add to the preceding observations, that on going to Killiney Hill at half-past 7 o'clock on the morning of the 2nd November, I passed through and got above a singular fog which lay perfectly at rest up to about half the height of the hill, and was seen enveloping Howth to about two-thirds of its height, with a keen and perfectly level upper surface, from which we emerged as from an opaque fluid.

“That on coming into town at half-past 5 o'clock in the evening of the same day, after having seen the meteor, we plunged suddenly at the River Dodder into a similarly dense

mass of fog, which we again passed out of before reaching Westland-row Terminus. I know not how far, if at all, such fogs may be found connected with luminous meteors.

“On the 30th of October last, at about 5 o'clock in the evening, being on the strand of Killiney Bay, my son and I also saw a meteor, very much like that I have just described, flying horizontally, and disappearing in the opening between the obelisk and Rochestown hills. It was too distant and little seen to enable any accurate observation to be made; but it was, like the present, at the first glance taken for a rocket.”

The Rev. Dr. Todd read the following extract from a letter from John T. Rowland, Esq., giving an account of the discovery of a rudely cut stone found near Ardee:

“I send you herewith, for presentation to the Royal Irish Academy, an ancient basin or urn, which I found in January, 1848, on the lands of Paughenstown, about two and a half miles east of Ardee, where caves had been discovered by workmen employed in deep-draining a large field which had been laid down for many years, and which in appearance was almost level, presenting no indication whatever of tumuli or mounds.

“When I arrived at the place, there were, in the middle of the field, two great heaps of stones, the scattered remains of the caves or chambers. It appeared that the workmen (in making a drain from north to south) came upon a wall of dry stones, at a depth of about five feet from the surface; in following which they found it to be one of two walls running parallel, about two and a half feet asunder, forming a passage covered with large flags, running on to a distance of about ten feet, when it turned to the west, and opened into a circular chamber about twelve feet in diameter and ten feet in height, having a conical roof, capped on top by a large flag about six feet in diameter, which still lay on the field unbroken. In this